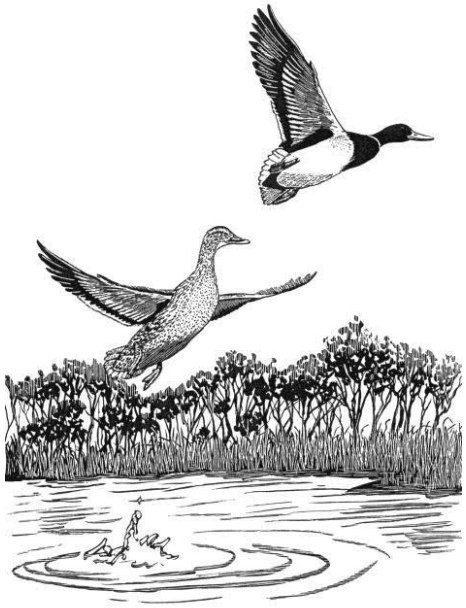
Understanding Factors that Influence Hunter Preferences for Timing of Waterfowl Hunting Seasons



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EXECUTIVE SUMMARY

In the fall of 2017, staff from the Cornell Center for Conservation Social Sciences (CCSS) worked with staff from the New York State Department of Environmental Conservation (DEC) to conduct a statewide survey of waterfowl hunters. This report synthesizes results from the 2017 statewide waterfowl hunter survey.

Study purpose: The Migratory Game Bird Team within DEC identified a need for information on what hunters find valuable with respect to waterfowl hunting season dates in the waterfowl hunting zone (i.e., Western Zone, Southeastern Zone, Northeastern Zone, Long Island Zone) where season dates were most important to them. We designed the 2017 statewide waterfowl hunter survey to address the following research objectives:

> *Objective 1:* Collect information needed to place relative weights on facets of waterfowl hunter satisfaction that may be affected differentially by alternative sets of hunting season start and end dates.
>
> *Objective 2:* Collect sociodemographic and activity-involvement information necessary to compare hunting-related satisfaction among waterfowl hunting subgroups.

METHODS

Sampling

- We drew a statewide random sample of 6,000 duck hunters. We drew 30% of the sample (n=1,800) from the population of 2016/17 duck hunters who provided an email address to DEC; we drew the remaining 70% of the sample (n=4,200) from the population of 2016/17 duck hunters who did not provide an email address. This approach yielded a sample that mirrors the proportion of 2016/2017 waterfowl hunters who provided an email address (i.e., 30% of the hunter population provided an email address to DEC in 2016/2017 and 70% did not).

Survey instrument

- We developed questionnaire items that assessed the importance respondents placed on: seeing and shooting wood ducks and teal species; seeing and shooting mallards and black ducks; seeing and shooting diving ducks; seeing and shooting any ducks; having maximum opportunity to go duck hunting; and minimizing overlap of waterfowl and deer hunting seasons. Satisfactions categories were developed collaboratively during a facilitated half-day workshop convened on June 17, 2017 with 20 members of the waterfowl hunter task forces from around the state, DEC staff and HDRU researchers.

- Each respondent was asked to rate and rank the importance of these factors as reasons for their season date preferences in the single waterfowl hunting zone where season dates were most important to them.

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Survey implementation

- CCSS contracted with the Survey Research Institute (SRI) at Cornell University to conduct an online survey with a random sample of 1,800 2015/16 duck hunters. CCSS staff provided the survey sample and survey instrument. SRI staff sent out invitation emails to members of the sample on October 11, 2017. They sent reminder emails to non-respondents on October 18, October 26, November 5, and November 14, 2017. Data collection ended on November 25, 2017.

- CCSS staff implemented a mail survey with a random sample of 4,200 2015/16 duck hunters. We contacted each member of the sample up to 4 times. We completed all survey mailings between October 11, 2017 and November 8, 2017. Data collection ended on November 30, 2017.

- A team of trained phone interviewers at SRI completed a set of follow-up interviews with 200 hunters who did not respond to the mail survey. The nonrespondent telephone interview contained a set of 15 questions from the mail survey instrument. SRI completed these interviews between December 5, 2017 and December 19, 2017.

Analysis

- Some respondents did not correctly complete the question in which they were asked to rank importance of 6 factors that could influence satisfaction with hunting season dates. We made a decision to exclude those respondents when analyzing results from questions where hunters were asked to rate and rank the importance of factors that could affect their satisfaction with waterfowl hunting season dates. Because most of the excluded data was obtained through the mail survey, we weighted the data by survey response mode before analyzing the rating and ranking question results.

FINDINGS HIGHLIGHTS

- A total of 2,791 hunters completed the entire mail or web questionnaire, yielding a 47.2% combined response rate after removing undeliverable questionnaires. Response to the web survey was approximately 54% (i.e., 978 returns from a deliverable sample size of 1,800); response to the mail survey was approximately 45% (i.e., 1,813 returns from a deliverable sample size of 4,056).

Nonrespondent-respondent comparisons

- Nonrespondents were not different from respondents with regard to gender (97.5% male vs. 98.1% male), participation in goose hunting in the last 5 years (85.5% vs. 88.0%) whether they had gone deer hunting in the last 5 years (89.0% vs. 85.1%), the waterfowl hunting zone where season dates were of greatest personal importance, or mean number of days hunting for diving ducks and sea ducks in the 2016-17 hunting season.

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- Nonrespondents differed from respondents on several other measures. Nonrespondents were younger than respondents (mean age 37.9 vs. 47.6 years old) and, on average, started hunting ducks more recently than respondents (e.g. 41.7% of nonrespondents had started duck hunting in 2010 or later, compared to 22.9% of respondents who had started duck hunting in 2010 or later). Waterfowl hunting aviditiy was also slightly lower among nonrespondents. Nonrespondents were less likely than respondents to call duck hunting their most or one of their most important activities (58.8% vs. 68.1%). Nonrespondents were less likely than respondents to have hunted ducks all of the last 5 years (57.8% vs. 73.9%). Nonrespondents differed from respondents on mean number of days hunting for puddle ducks in the 2016-17 hunting season (mean 8.2 days vs. 9.1 days).

Importance ratings for factors that may affect season date preferences

- We asked waterfowl hunters to rate how important 12 specific factors were as reasons for their preferences about when the waterfowl hunting season should be open in the zone that was most important to them. Specific reasons were listed under 6 categories: seeing and shooting wood duck or teal species; seeing and shooting mallard and black duck; seeing and shooting diving ducks; seeing and shooting any ducks (regardless of species); having maximum opportunity to go duck hunting; and minimizing overlap of waterfowl and deer hunting seasons.

- For most waterfowl hunters, multiple factors were important to preferences for season timing. More than half of respondents in every waterfowl hunting zone indicated that 7 of the 12 factors listed were very or extremely important as reasons for their season timing preferences. The specific factors that were most important across all zones were: being able to hunt when mallard and black duck are most abundant or most available, being able to hunt when the abundance of ducks (regardless of species) is highest; and being able to hunt when the variety of duck species is the highest (peak variety of ducks at any one point).

Importance rankings for factors that may affect satisfaction with season dates

- We aggregated 12 individual reasons for season date preferences into 6 categories of factors that influence season date preferences. In every waterfowl hunting zone "Seeing and shooting mallard and black duck" was ranked as the most important influence on satisfaction with waterfowl hunting season dates in the zone of most importance to the respondent. "Seeing and shooting diving ducks" and "Minimizing overlap of waterfowl and deer seasons" were ranked as having the least influence on satisfaction with waterfowl hunting season dates in the zone of most importance to the respondent.

- We found that respondents were more likely than nonrespondents to be avid waterfowl hunters (i.e., were more likely to say waterfowl hunting was more important than, or was their most important, recreational activity). We created a weighting factor to adjust the avidity level to account for respondent-nonrespondent differences. We found that the rank order of influences on satisfaction with waterfowl hunting season dates was the same whether the data were weighted or were not weighted for hunter avidity.

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NEXT STEPS

Data on waterfowl hunter satisfactions were provided to DEC and are being used by DEC's Migratory Game Bird Team (in combination with other information) to evaluate alternative sets of hunting season dates in each waterfowl hunting zone. Personnel from the New York Cooperative Fish and Wildlife Research Unit (NYCFWRU) will advise and assist DEC in using data on hunter satisfactions in a structured decision making approach to evaluate season date alternatives, with regard to how those alternatives may impact waterfowl hunter satisfactions.

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ACKNOWLEDGMENTS

We extend our appreciation to New York State's waterfowl hunters for their participation in this study. Many staff members within the New York State Department of Environmental Conservation (DEC) Bureau of Wildlife helped during various phases of this research. For their assistance, we express our thanks to Thomas Bell, James Eckler, Steve Heerkens, John O'Conner, Michael Schiavone, Josh Stiller, and Mike Wasilco.)

We express our appreciation to Angela Fuller (New York Cooperative Fish and Wildlife Research Unit) for her assistance with survey instrument design and data analysis.

For their assistance with pretesting a portion of the survey instrument, we thank New York State Waterfowl Hunter Task Force members: James Adriance, Richard Colesante, Ron Falkowski, Jay Forster, George Gedney, Tom Humberstone, Bill Kalwas, Ron Kee, Mark Kircher, Vince Olechnowicz, Red Oster, Ron Sineo, Kurt Snyder, James Tracy, Gary Will, Ron Zega, and Ken Zolnowski.

The Survey Research Institute (SRI) at Cornell University implemented our web-based survey of duck hunters and conducted nonrespondent follow-up interviews.

Nancy Connelly (Cornell Center for Conservation Social Sciences) provided consultation on sampling strategy, data weighting, and analysis. Karlene Smith assisted with survey implementation and data coding.

Our survey instrument and request to conduct survey research was reviewed and granted exemption from review by the Cornell University Office of Research Integrity and Assurance (Institutional Review Board for Human Participants Protocol ID# 1006001472).

This work was supported by the New York Federal Aid in Wildlife Restoration Grant WE-173-G.

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BACKGROUND

Waterfowl season frameworks in New York State are developed through collaboration of the U.S. Fish and Wildlife Service (Service) and the Atlantic Flyway Council (i.e., state and provincial natural resource agency representatives) on an annual basis. The final federal framework is released in February and defines the allowable outside dates for seasons, season length, and bag limits. The New York State Department of Environmental Conservation (DEC) is charged with selecting season dates in 4 of the 5 New York State waterfowl zones by April 30th each year for the Service to publish in the federal register (Lake Champlain Zone season dates are set by Vermont Fish and Wildlife).

Waterfowl hunters desire the season to be open during the peak migration in their favorite hunting locations. Although New York is allowed the greatest number of waterfowl zones of any state in the Atlantic Flyway, meeting the diverse, and often competing, interests of different types of waterfowl hunters in a given zone may not be possible within the constraints of the allowable season dates and season length. The challenge is especially apparent in the Western Zone, which has the greatest number of waterfowl hunters and a great diversity of species bag composition and waterfowl habitats (from the Great Lakes, to large rivers, Finger Lakes, and important shallow water marshes). Given these challenges, identifying the optimal waterfowl season dates can be a contentious issue among hunters.

Prior to 1997, waterfowl seasons in each zone were set by a season-setting team (SST) of DEC biologists from across the state. Members of the SST held public meetings, attended sportsman's federation meetings, and accepted comment via phone and mail, and then proposed season dates they believed reflected the best interests of waterfowl hunters in each zone.

In the 1990s, the SST began to consider how hunters could be more directly involved in the season-setting process. The SST determined that, in general, waterfowl populations are protected as long as the hunting season complies with the federal framework; the selection of hunting dates within the federal framework were deemed to be a social issue and it was decided that a representative group of hunters in each zone could recommend the best season dates. In 1997, DEC held the first Waterfowl Hunter Task force for the Western Zone where the need for public involvement appeared to be greatest. Over the next 10 years, task forces were added in all 4 waterfowl zones where DEC is tasked with recommending season dates.

Task force membership is developed annually by the DEC Migratory Game Bird Team (MGB team). Task forces are comprised of avid waterfowl hunters from throughout the zone and one DEC biologist. While the list is updated annually, the group is often fairly consistent from year to year; some original task force members still participate in the Western Zone, 20 years after its formation. Membership lists are mostly made up of hunters representing long-standing waterfowl hunting organizations, NYS Conservation Council regions, County Sportsmen Federations, waterfowl interest groups, and sportsmen's organizations. Additionally, some "at large" members are chosen to represent portions of the state the MGB team believes to be underrepresented in the task force as a whole.

Waterfowl hunter task forces have served a valuable role by including the most avid regulated community in the decision-making process and reduced complaints to an extent. At the time, a

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citizen task force was the best option and successfully involved avid hunters in the decision-making process and annual recommendations tended to follow relatively consistent, but informal "season formulas." However, the task force process, as it has operated for the past 2 decades, lacks clearly defined objectives, mechanisms to evaluate whether or not the group decisions are representative of all waterfowl hunters in each zone, and does not explicitly incorporate available data on duck migration timing. Duck hunters not involved in the task force process and the MGB Team have raised valid questions about the task force objectives, group composition, willingness of task force members to consider new data or ideas, and ultimate "fairness" of the process (i.e., a select few hunters representing a diverse region).

Questions have been raised by the public and the MGB team as to whether or not the interests of *all* hunters are being appropriately represented and whether or not the group composition over or under represents certain geographic regions, viewpoints, or preferences within each zone. Some hunters (especially in the Western Zone) have also expressed concerns that their opinions are ignored by their task force representatives. Additionally, hunters are sometimes surprised by sudden and abrupt changes to the "season formula" each task force has developed. For example, in 2016 the Southeastern Zone opened prior to the Northeastern Zone for the first time. Due to the federal regulations cycle, there is limited time for public outreach beyond the hunter task forces. Such a notable deviation from the "normal season," without greater public outreach to the hunting community and without clear justification, was considered unacceptable by some hunters.

In an effort to clarify the goals of season setting, the MGB Team developed 3 objectives for a revised process for selecting dates: (1) maximize hunter satisfaction with, and inclusion in the decision-making process; (2) ensure the decision making process is scientifically defensible and data driven; (3) all steps involved in the decision making process are clear and transparent. The MGB Team decided the best means to accomplish these objectives was to develop a structured decision-making framework that included the established waterfowl task forces at multiple stages of the process to assist setting waterfowl hunting season dates in New York. The revised process incorporates the experience and knowledge of the most avid hunters while giving the regulated community (all duck hunters) a voice in what they value in their duck hunting experience and preferences for waterfowl season dates.

Research Purpose and Objectives

The MGB Team identified a need for information on what hunters with different waterfowl hunting zone preferences (e.g., preference for the Western Zone, preference for the Long Island Zone) find valuable with respect to waterfowl hunting season dates. This research was designed to address DEC's information needs associated with a revised process for setting waterfowl hunting season dates in New York State.

Data on waterfowl hunter satisfactions will be used in combination with other information to evaluate alternative sets of hunting season dates in each waterfowl hunting zone. Personnel from the New York Cooperative Fish and Wildlife Research Unit (NYCFWRU) will advise or assist DEC in using data on hunter satisfactions in a structured decision-making approach to evaluating

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season date alternatives. We designed a New York State waterfowl hunter survey to address the following research objectives:

> *Objective 1:* Collect information needed to place relative weights on facets of waterfowl hunter satisfaction that may be affected differentially by alternative sets of hunting season start and end dates.
>
> *Objective 2:* Collect sociodemographic and activity-involvement information necessary to compare hunting-related satisfaction among waterfowl hunting subgroups.

METHODS

We collected information from waterfowl hunters using a web-based and a mail survey. This approach provided a cost-effective way to increase survey sample size.

A mixed-methods implementation has been used previously to survey waterfowl hunters. Lesser et al. (2011) found responses to questions in the mail-mode and the mixed-mode surveys (i.e., contacted by mail and invited to visit a website to complete a questionnaire) were similar. Laborde et al. (2014) compared responses from a mail survey with a random sample of waterfowl hunters and a web-based survey open to the general public. By comparison, respondents to the web survey hunted more frequently, harvested more waterfowl, and placed greater importance on waterfowl hunting, but the survey groups were similar in attitudes toward regulatory alternatives. These findings suggest that it is reasonable to use a mixed-mode approach to data collection from waterfowl hunters.

Sampling

Waterfowl hunters are required to participate in the New York State migratory game bird Harvest Information Program (HIP). All HIP registrants provide a mailing address and some provide an email address. We drew our sample from records of HIP registrants.

The target population for this study was New York State duck hunters age 18 or older. NYSDEC provided access to a listing of all 18, 207 hunters who completed a HIP form, were 18 years of age or older, and hunted ducks in the 2016/17 hunting license year (see Table 1). Duplicate records were removed from the hunter database before the sample was drawn.

We established several sampling criteria**:** obtain at least 400 completed questionnaires in each waterfowl hunting zone; account for known differences in proportion of waterfowl hunters by zone (e.g., nearly half of all duck hunters live in the Western Zone); and stay within budget limitations. To address these criteria, we drew a statewide random sample of 6,000 duck hunters. We drew 30% of the sample (n=1,800) from the population of 2016/17 duck hunters who provided an email address to DEC; we drew the remaining 70% of the sample (n=4,200) from the population of 2016/17 duck hunters who did not provide an email address (representing 70% of the hunter population). This approach yielded a sample that mirrors the proportion of 2016/2017 waterfowl hunters who provided an email address (i.e., 30% of the hunter population provided an email address to DEC in 2016/2017 and 70% did not).

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Table 1. Waterfowl hunting zone where 2016/17 duck hunter population lived, and proportion of hunters by zone of residence in the statewide random samples drawn for the 2017 duck hunter web and mail surveys.

Waterfowl hunting zone	2016/17 Duck hunters		2017 Web survey		2017 Mail survey	
	Population (n)	% of population who live in zone	Sample size	% of sample	Sample size	% of sample
Western Zone	8,525	46.8	851	47.3	2,027	48.3
Long Island Zone	2,432	13.3	254	14.1	579	13.8
NYC - Closed	207	1.1	27	1.5	41	1.0
Northeastern Zone	2,844	15.6	273	15.2	692	16.5
Southeastern Zone	3,751	20.6	395	21.9	861	20.5
NA	448	2.4	-	-	-	-
Total	18,207	100.0	1,800	100.0	4,200	100.0

Because everyone in the duck hunter population had an equal probability of being selected in this sampling approach, the resulting data do not need to be weighted by survey mode. A second benefit of this approach is that it yields a large sample size in the Western Zone, where views on season dates may be the most diverse. The large sample size in that zone will yield narrow confidence intervals around estimates of variables (i.e., 95% confidence that answers are within plus or minus 3% of true mean). This approach was not expected to yield the desired level of responses (n=400) from duck hunters who were most concerned about hunting season dates in the Long Island Zone, but was expected to garner more than 277 completions (enough for 90% confidence that answers are within plus or minus 5% of true mean). Any measures taken to increase number of responses in the Long Island Zone would have created other challenges (e.g., added costs to increase the entire sample size, need to weight the data in additional ways) that were unacceptable to the study team.

Survey Instrument

We developed a survey instrument (Appendix A) in cooperation with DEC's Migratory Game Bird Team and NYCFWRU personnel. We pretested key elements in the questionnaire with members of waterfowl hunter task forces from across the state. The Cornell University Office of Research Integrity and Assurance reviewed and approved the questionnaire (Institutional Review Board for Human Participants, Protocol ID# 1006001472).

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The questionnaire included multiple items that allowed us to understand respondents' recent waterfowl hunting behavior, affiliation with hunter organizations, and waterfowl hunting avidity level. We also included questions to assess hunter opinions on 3 specific issues related to waterfowl seasons that are frequently discussed by waterfowl hunter task forces in New York. The key elements of the instrument were questions asking respondents to rate and rank factors that may influence satisfactions with waterfowl hunting season dates.

Creating duck hunter typologies

We asked several questions about specific experiences in 2016–2017 (the year prior to the survey) to compare characteristics of respondents in 2017 with respondents from a 2005 statewide duck hunter survey (Enck et al. 2006). We replicated an approach developed by Enck and Decker 1990 (and re-used by Enck et al. 2006), to construct hunter typologies based on kinds of waterfowl hunted, habitats hunted, and type of land they had accessed to hunt in the 2016–2017 season.

First, we asked recipients to indicate how many days they hunted during the 2016–2017 season primarily for diving ducks, puddle ducks, sea ducks, and geese. We summed these days for each respondent, and assigned respondents to a waterfowl type based on the category of waterfowl they had hunted >50% of days: diving duck hunter, puddle duck hunter, sea duck hunter, goose hunter, or species generalist (if they did not hunt for >50% days primarily for anyone type).

Next we asked how many days they had hunted during the 2016–2017 season in shallow water habitats (marshes, beaver ponds, small rivers) that become inaccessible after freezing temperatures; how many days in deeper water habitats (big lakes, big rivers, or ocean) that remains accessible after freezing temperatures; and how many days in agricultural fields. Similar to the approach described above, we summed these days for each respondent, and characterized habitat type based on the type of habitat they had hunted >50% of days: shallow water hunter, deep water hunter, field hunter, or generalist (if they did not hunt for >50% days primarily in anyone habitat).

For the third typology, we asked how many days they had hunted on public land, private land for free, and private land for pay, including leased land, shooting preserves, or waterfowl hunting clubs. We summed these days for each respondent, and characterized access type based on the type of land they had accessed for hunting on >50% of days: public land hunter, private land for free hunter, private land for pay hunter, or generalist (if they did not hunt for >50% days primarily using anyone type of access).

Identifying factors that affect satisfaction with waterfowl hunting season dates

To determine and rank conditions that contribute to hunter satisfaction with waterfowl hunting season dates, we assessed the importance of multiple conditions pertaining to: seeing and shooting wood duck and teal species (2 items), seeing and shooting mallard and black duck (2 items) seeing and shooting diving ducks (2 items), seeing and shooting any ducks (regardless of species) (3 items), having maximum opportunity to go duck hunting (2 items), and minimizing overlap of waterfowl and deer hunting seasons (2 items). Hunters were asked to rate how

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important each condition was as a reason for their preference for when the duck season should be open in the waterfowl hunting zone that was most important to them. Then, we aggregated the 12 individual conditions into 6 categories, and we asked hunters to rank the categories from most important (ranking = 1) to least important (ranking = 6) in determining their satisfaction with waterfowl hunting season dates in the hunting zone most important to them. Satisfactions categories were developed collaboratively during a facilitated half-day workshop convened on June 17, 2017 with 20 members of the waterfowl hunter task forces from around the state, DEC staff and HDRU researchers.

Survey Implementation

Web-based survey

CCSS contracted with the Survey Research Institute (SRI) at Cornell University to conduct an online survey with a random sample of 1,800 2016-2017 HIP registrants that indicated they hunted ducks during the previous year. CCSS staff provided the survey sample and survey instrument. SRI staff sent out invitation emails to members of the sample on October 11, 2017. They sent reminder emails to non-respondents on October 18, October 26, November 5, and November 14, 2017. Data collection ended on November 25, 2017.

Mail survey

CCSS staff implemented a mail survey with a random sample of 4,200 2016-2017 HIP registrants that indicated they hunted ducks during the previous year. We contacted each member of the sample up to 4 times. We completed all survey mailings between October 11, 2017 and November 8, 2017. Data collection ended on November 30, 2017. To encourage survey response, several characteristics of the Dillman (2000) Total Design Method were incorporated, including a brief, respondent-friendly questionnaire, multiple contacts, and cover letter elements that personalized correspondence.

Nonrespondent follow-up study

A team of trained phone interviewers at SRI completed a set of follow-up interviews with 200 hunters who did not respond to the mail survey. The nonrespondent telephone interview contained a set of 15 questions from the mail survey instrument.

SRI completed these interviews between December 5, 2017 and December 19, 2017. SRI staff had attempted to reach 500 nonrespondents when the goal of 200 interviews was reached. Final disposition of telephone contacts were as follows: interview completed (n=200), bad telephone number (n=25), ineligible (had already returned questionnaire) (n=13), refused the interview (n=2), language barrier (n=2), deceased or too ill to respond (n=2), pending: Called <6 times with no resolution (n=240), pending: called 6+ times (n=16).

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Analysis

We used IBM SPSS Statistics 24.0 software (IBM Corp. 2016) to calculate frequencies and measures of central tendency (e.g., mean). We placed respondents into subgroups (e.g., waterfowl hunting zone) for comparison. Hunters were placed into 1 of 4 hunting zone categories based on their response to the question, "In which one waterfowl hunting zone are season dates most important to you?" We used the chi-square statistic and t-tests to test for significant differences between respondents and nonrespondents at the $P < 0.05$ level.

Some respondents did not correctly complete the question in which they were asked to rank importance of 6 factors that could influence satisfaction with hunting season dates. We made a decision to exclude those respondents when analyzing results from questions where hunters were asked to rate and rank the importance of factors that could affect their satisfaction with waterfowl hunting season dates. Because most of the excluded data was obtained through the mail survey, we weighted the data by survey response mode before analyzing the rating and ranking question results. Web-survey responses received a weight of 0.7052; mail-survey responses received a weight of 01.2911.

RESULTS

A total of 2,791 hunters completed the entire mail or web questionnaire (and 83 additional hunters partially completed the web survey). That yielded a 47.2% combined response rate after removing the 144 undeliverable questionnaires (i.e., 2,791 returns from a deliverable sample size of 5,856). Response to the web survey was approximately 54% (i.e., 978 returns from a deliverable sample size of 1,800); response to the mail survey was approximately 45% (i.e., 1,813 returns from a deliverable sample size of 4,056).

Nonresponse Bias Analysis

Nonrespondents were not different from respondents with regard to gender (97.5% male vs. 98.1% male), participation in goose hunting in the last 5 years (85.5% vs. 88.0%) whether they had gone deer hunting in the last 5 years (89.0% vs. 85.1%), waterfowl hunting zone where season dates were most important to them, or on mean number of days hunting for diving ducks or sea ducks in the 2016-17 hunting season (Appendix B).

Nonrespondents differed from respondents on several other measures. Nonrespondents were younger than respondents (mean age 37.9 vs. 47.6 years old) and, on average, started hunting ducks more recently than respondents (e.g. 41.7% of nonrespondents had started duck hunting in 2010 or later, compared to 22.9% of respondents who had started duck hunting in 2010 or later). Nonrespondents were less likely than respondents to call duck hunting their most or one of their most important activities (58.8% vs. 68.1%). Nonrespondents were less likely than respondents to have hunted ducks all of the last 5 years (57.8% vs. 73.9%). Nonrespondents differed from respondents on mean number of days hunting for puddle ducks in the 2016-17 hunting season (mean 8.2 days vs. 9.1 days) (Appendix B). We made a decision not to weight the data based on respondent-nonrespondent differences.

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Characteristics of Respondents

Throughout the results section we have grouped respondents based on the waterfowl hunting zone where duck hunting season dates were most important to respondents. Tables 2–9 provide insights about the activity involvement characteristics of the hunters in these zone groupings. Those insights are helpful when interpreting survey results on factors that influence respondents' preferences for duck hunting season dates.

Nearly all respondents (98%) were male. Gender ratio was not different across respondents when grouped by zone in which the respondents found season dates most important. Respondents ranged in age from 19 to 92 (mean age 47.6 years). In every zone, a majority of respondents had started hunting ducks in 1999 or earlier (i.e., the majority had been duck hunters for 17 years or longer). Over 20% of respondents were relatively new participants, having started duck hunting in the year 2000 or later (Table 2).

Duck hunters expressed a range of avidity (i.e., importance) toward duck hunting as a recreational activity. A majority of respondents in every zone (i.e., from 66% in the Northeastern zone to 75% in the Long Island Zone) described duck hunting as their most important recreational activity or more important than many of their recreational activities (Table 3). The majority (74%) were consistent duck hunters who had hunted each of the previous 5 years (no difference between zones, χ^2=15.96, df=15, p=0.384, grand mean 4.47 out of 5 years). The remaining respondents could be considered "sporadic" participants who considered themselves duck hunters, but had not gone hunting in every year.

Table 2. Year when survey respondents started hunting ducks, grouped by waterfowl hunting zones where respondents found season dates most important.

Year you began hunting	Zone where season dates are most important				Total (n=2,656)
	Western (n=1,201)	Northeastern (n=579)	Southeastern (n=508)	Long Island (n=368)	
	%	%	%	%	%
Before 1980	31.1	31.3	31.3	25.8	30.4
1980 to 1989	13.6	12.4	13.0	13.9	13.3
1990 to 1999	13.5	13.8	12.4	12.5	13.2
2000 to 2009	19.7	20.0	22.0	22.0	20.5
2010 or later	22.2	22.5	21.3	25.8	22.6
Total	100.0	100.0	100.0	100.0	100.0

Chi square = 7.776, df = 12, p = 0.802

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Table 3. Importance survey respondents placed on duck hunting as a recreational activity, grouped by waterfowl hunting zones where respondents found season dates most important.

	Zone where season dates are most important				
	Western (n=1,203)	Northeastern (n=577)	Southeastern (n=504)	Long Island (n=366)	Total (n=2,650)
	%	%	%	%	%
It's my most important recreational activity	17.9	20.5	21.4	19.7	19.4
It's more important than many of my recreational activities	49.6	45.4	49.0	55.7	49.4
It's no more important than my other recreational activities	26.4	28.4	22.8	21.6	25.5
It's less important than many of my recreational activities	5.2	4.7	5.8	1.9	4.7
It's one of my least important recreational activities	0.9	1.0	1.0	1.1	1.0
Total	100.0	100.0	100.0	100.0	100.0

Chi square = 21.55, df = 12, p = 0.043

We asked respondents to report the number of days they hunted for ducks in the 2016–2017 hunting season in each waterfowl hunting zone. Response to these questions confirmed that most respondents (94%–97%) were active (i.e., hunted at least 1 day) in the zone in which they said that season dates were most important. For example, 96% of respondents who reported that season dates were most important to them in the Western Zone had hunted at least 1 day in the Western Zone in 2016–2017. Responses also documented that substantial minorities of respondents hunted in more than one zone. For example, 20% of respondents grouped in the Western Zone also hunted 1 or more days in the Northeastern zone in 2016–2017 (Table 4).

Statewide, respondents who were active (i.e., hunted $\geq$1 day) had hunted ducks an average of 13.6 days (SE=0.23) during the 2016-2017 waterfowl hunting season. Mean number of days hunted ranged from 12.3 in the Southeastern Zone to 16.0 in the Long Island Zone (Table 5).

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Table 4. Proportion of hunters who hunted at least 1 day in each waterfowl hunting zone in New York State during the 2016-2017 season, grouped by waterfowl hunting zones where respondents found season dates most important.

Zones where respondents hunted	Zone where season dates are most important to respondent							
	Western (n=1,188)		Northeastern (n=558)		Southeastern (n=496)		Long Island (n=358)	
	n	%	n	%	n	%	n	%
Western	1,142	96.1	118	21.1	71	14.3	7	2.0
Northeastern	240	20.2	527	94.4	103	20.8	14	3.9
Lake Champlain	12	1.0	75	13.4	34	6.9	9	2.5
Southeastern	90	7.6	100	17.9	472	95.2	37	10.3
Long Island	11	0.9	11	2.0	24	4.8	348	97.2

Table 5. Mean number of days duck hunting in New York State during the 2016-2017 season, grouped by waterfowl hunting zones where respondents found season dates most important.

Hunting zone where season dates are most important to respondent	n	Mean number of days hunting ducks in 2016-2017 season[1]	Standard error of mean (SE)
Western Zone	1,151	13.1	(0.32)
Northeastern Zone	548	14.5	(0.56)
Southeastern Zone	483	12.3	(0.52)
Long Island Zone	353	16.0	(0.71)
Total	2,715	13.6	(0.23)

[1]Mean calculated for active hunters (i.e., those who had hunted $\geq$ 1 days in the 2016/2017 waterfowl hunting season)

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In all zones most hunters had spent one or more days hunting puddle ducks. In the Western Zone, Northeastern Zone, and Southeastern Zone, pluralities of respondents had hunted one or more days for diving ducks. Respondents who cared most about season dates in the Long Island Zone were more likely than respondents in other groups to have hunted diving ducks or sea ducks (Table 6).

Majorities of hunters who cared most about season dates in the Western Zone, Northeastern Zone, and Long Island Zone were characterized as waterfowl generalists. Pluralities of respondents were characterized as puddle duck hunters. Very few respondents in any zone were characterized as sea duck hunters. A majority (67%) of Long Island Zone hunters were characterized as waterfowl generalists, dividing their hunting time across more than one species group (Table 7).

Majorities of hunters in every hunting zone had hunted at least one day in shallow water and deep water habitats. In 2 of the zones majorities also had hunted at least one day in agricultural fields (Table 8). In every zone pluralities of hunters were categorized as habitat generalists. Respondents who reported that season dates were most important to them in the Long Island Zone were more likely than other hunters to be characterized as deep water hunters (Table 9).

Respondents used a variety of land access types. In all zones, pluralities of hunters were characterized as access type generalists. In every zone substantial proportions were characterized as public land/water hunters. Respondents who cared most about season dates in the Long Island Zone were less likely than other hunters to be characterized as private land (free access) hunters. Few hunters were characterized as private land (fee access) hunters (Table 10).

Importance ratings for factors that may affect season date preferences

We asked waterfowl hunters to rate how important 12 specific factors were as reasons for their preferences about when the waterfowl hunting should be open in the zone that was most important to them. Specific reasons were listed under 6 categories: seeing and shooting wood duck or teal species; seeing and shooting mallard and black duck; seeing and shooting diving ducks; seeing and shooting any ducks (regardless of species); having maximum opportunity to go duck hunting; and minimizing overlap of waterfowl and deer hunting seasons. For most waterfowl hunters, multiple factors were important to preferences for season timing. More than half of respondents in every waterfowl hunting zone indicated that 7 of the 12 factors listed were very or extremely important as reasons for their season timing preferences (Tables 11–14). The specific factors that were most important across all zones were: being able to hunt when mallard and black duck are most abundant or most available, being able to hunt when the abundance of ducks (regardless of species) is highest; and being able to hunt when the variety of duck species is the highest (peak variety of ducks at any one point).

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Table 6. Percent of hunters who spent 1 or more days hunting diving ducks, puddle ducks, or diving ducks, grouped by waterfowl hunting zones where respondents found season dates most important.

	Zone where season dates are most important to respondent			
	Western (n=1,180)	Northeastern (n=563)	Southeastern (n=499)	Long Island (n=345)
	%	%	%	%
Diving ducks (scaup, redhead, bufflehead, etc.)				
Hunted diving ducks ≥ 1 day	47.1	39.6	21.4	60.6
Puddle ducks (mallard, wood duck, teal species, etc.				
Hunted puddle ducks ≥ 1 day	94.0	94.0	93.4	89.0
Sea ducks (scoters, eiders, long-tailed duck)				
Hunted sea ducks ≥ 1 day	7.5	6.2	4.8	33.7

Table 7. Types of waterfowl hunted most often during the 2016-2017 waterfowl season by active duck hunters, grouped by waterfowl hunting zones where respondents found season dates most important.

	Zone where season dates are most important to respondent							
	Western		Northeastern		Southeastern		Long Island	
	n	%	n	%	n	%	n	%
Waterfowl Generalists	651	58.0	269	50.2	207	44.3	232	67.2
Puddle duck hunters	299	26.6	195	36.4	193	41.3	77	22.3
Goose hunters	141	12.6	63	11.8	65	13.9	19	5.5
Diving duck hunters	30	2.7	9	1.7	2	0.4	10	2.9
Sea duck hunters	1	0.1	0	0.0	0	0	7	2.0
Total	1,122	100.0	536	100.0	467	99.9	345	99.9

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Table 8. Percent of hunters who spent one or more days hunting shallow water habitats that freeze over, deep water or running water habitats that do not freeze over, or agricultural fields, grouped by waterfowl hunting zones where respondents found season dates most important.

	Zone where season dates are most important to respondent			
	Western (n=1,180)	Northeastern (n=563)	Southeastern (n=499)	Long Island (n=345)
	%	%	%	%
Habitat that becomes inaccessible to ducks after freezing temperatures (e.g., shallow marsh, beaver pond)				
Hunted shallow water ≥ 1 day	77.0	78.6	80.0	55.3
Habitat that remains accessible to ducks after freezing weather (e.g., big lakes, big rivers, ocean)				
Hunted open water ≥ 1 day	71.7	66.2	58.5	81.7
Agricultural fields				
Hunted fields ≥ 1 day	53.7	50.1	45.5	35.2

Table 9. Types of waterfowl hunting habitat used most often during the 2016-2017 waterfowl season by active duck hunters, grouped by waterfowl hunting zones where respondents found season dates most important.

	Zone where season dates are most important to respondent							
	Western		Northeastern		Southeastern		Long Island	
	n	%	n	%	n	%	n	%
Habitat type generalists	468	41.7	233	43.5	188	40.3	141	40.9
Shallow water hunters	291	25.9	162	30.2	149	31.9	43	12.5
Deep water hunters	247	22.0	96	17.9	91	19.5	139	40.3
Agricultural field hunters	116	10.3	45	8.4	39	8.4	22	6.4
Total	1,122	100.0	536	100.0	467	100.0	345	100

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Table 10. Land access types used most often during the 2016-2017 waterfowl season by active duck hunters, grouped by waterfowl hunting zones where respondents found season dates most important.

	Zone where season dates are most important to respondent							
	Western		Northeastern		Southeastern		Long Island	
	n	%	n	%	n	%	n	%
Access type generalists	373	33.2	207	38.6	168	36.0	145	42.0
Public land or Waters hunters	347	30.9	171	31.9	113	24.2	155	44.9
Private land (free) hunters	375	33.4	151	28.2	180	38.5	34	9.9
Private land (fee) hunters	27	2.4	7	1.3	6	1.3	11	3.2
Total	1,122	99.9	536	100.0	467	100.0	345	100

Table 11. Hunter importance ratings assigned to 12 possible reasons for duck hunting season date preferences, among hunters who said that season dates in the **Western Zone** were most important to them.

				Importance to date preferences in Western Zone				
	n	$\bar{x}$[1]	SE	Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting wood duck, teal species								
Be able to hunt when wood duck and teal are most abundant	918	2.32	0.038	28.5	31.0	25.0	10.4	5.1
Seeing and shooting mallard and black duck								
Be able to hunt when mallard and black duck are most abundant	913	1.76	0.028	46.4	35.6	15.2	1.8	1.0
Be able to hunt when mallard and black duck are most susceptible to decoying (newly arriving)	889	1.87	0.031	42.0	35.3	17.9	2.9	1.9
Seeing and shooting diving ducks (e.g., scaup, redhead, bufflehead, goldeneye)								
Be able to hunt when diving ducks are most abundant	910	3.00	0.048	21.7	18.2	21.0	16.6	22.3
Be able to hunt when diving ducks are most susceptible to decoying (newly arriving)	894	2.99	0.049	21.6	18.2	23.1	14.1	23.0

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Table 11. (Continued).

	n	$\bar{x}$[1]	SE	Importance to date preferences in Western Zone: Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting ANY ducks (regardless of species)								
Be able to hunt when the abundance of ducks (regardless of species) is highest	918	1.77	0.029	45.9	36.1	14.2	2.7	1.0
Be able to hunt when the variety of duck species is greatest (peak variety of ducks a at any one point)	912	1.93	0.032	40.3	33.2	21.3	3.3	1.9
Be able to hunt the greatest variety of duck species throughout the length of the season (total variety)	911	2.10	0.036	36.1	31.2	22.9	6.2	3.6
Having maximum opportunity to go duck hunting								
Include the most weekend days in the season	920	2.03	0.041	46.8	23.7	15.4	7.4	6.7
Include the most holidays in the season	911	2.43	0.044	33.8	21.3	23.1	11.5	10.3
Minimizing overlap of waterfowl and deer hunting seasons								
Minimize duck season overlap with the first week of firearm deer season	920	3.01	0.051	24.4	17.8	17.5	12.8	27.5
Avoid opening duck season on same day as youth big game hunting season	918	3.52	0.051	17.2	11.2	15.4	14.5	41.7

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Table 12. Hunter importance ratings assigned to 12 possible reasons for duck hunting season date preferences, among hunters who said that season dates in the **Northeastern Zone** were most important to them.

				Importance to date preferences in Northeastern Zone				
	n	$\bar{x}$[1]	SE	Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting wood duck, teal species								
Be able to hunt when wood duck and teal are most abundant	394	2.23	0.054	28.9	34.8	26.2	5.0	5.1
Seeing and shooting mallard and black duck								
Be able to hunt when mallard and black duck are most abundant	390	1.71	0.041	47.4	37.8	11.9	2.2	0.7
Be able to hunt when mallard and black duck are most susceptible to decoying (newly arriving)	377	1.83	0.048	44.8	34.5	15.0	4.6	1.2
Seeing and shooting diving ducks (e.g., scaup, redhead, bufflehead, goldeneye)								
Be able to hunt when diving ducks are most abundant	389	3.14	0.072	17.7	17.6	20.3	21.5	22.9
Be able to hunt when diving ducks are most susceptible to decoying (newly arriving)	388	3.16	0.072	17.3	17.7	21.3	18.9	24.9

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Table 12. (Continued).

	n	$\bar{x}$[1]	SE	Importance to date preferences in Northeastern Zone: Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting ANY ducks (regardless of species)								
Be able to hunt when the abundance of ducks (regardless of species) is highest	393	1.75	0.044	48.1	34.5	13.0	3.6	0.9
Be able to hunt when the variety of duck species is greatest (peak variety of ducks at any one point)	390	1.89	0.047	41.2	34.6	19.3	3.1	1.7
Be able to hunt the greatest variety of duck species throughout the length of the season (total variety)	389	2.08	0.053	37.3	28.6	25.0	6.8	2.2
Having maximum opportunity to go duck hunting								
Include the most weekend days in the season	392	2.20	0.069	44.9	19.7	16.8	7.5	11.0
Include the most holidays in the season	383	2.70	0.072	29.0	16.4	25.5	13.2	15.9
Minimizing overlap of waterfowl and deer hunting seasons								
Minimize duck season overlap with the first week of firearm deer season	394	3.43	0.079	18.9	12.5	15.5	12.8	40.3
Avoid opening duck season on same day as youth big game hunting season	391	3.86	0.073	11.9	8.4	14.6	12.4	52.7

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Table 13. Hunter importance ratings assigned to 12 possible reasons for duck hunting season date preferences, among hunters who said that season dates in the **Southeastern Zone** were most important to them.

				Importance to date preferences in Southeastern Zone				
	n	$\bar{x}$[1]	SE	Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting wood duck, teal species								
Be able to hunt when wood duck and teal are most abundant	349	1.96	0.055	40.1	34.2	18.1	4.6	3.1
Seeing and shooting mallard and black duck								
Be able to hunt when mallard and black duck are most abundant	345	1.66	0.041	49.4	37.4	11.9	1.0	0.4
Be able to hunt when mallard and black duck are most susceptible to decoying (newly arriving)	328	1.95	0.055	39.5	35.4	18.0	4.6	2.5
Seeing and shooting diving ducks (e.g., scaup, redhead, bufflehead, goldeneye)								
Be able to hunt when diving ducks are most abundant	343	3.69	0.074	11.5	8.4	19.5	20.6	40.0
Be able to hunt when diving ducks are most susceptible to decoying (newly arriving)	336	3.75	0.073	10.0	7.8	20.7	20.1	41.5

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Table 13. (Continued).

	n	$\bar{x}$[1]	SE	Importance to date preferences in Southeastern Zone: Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting ANY ducks (regardless of species)								
Be able to hunt when the abundance of ducks (regardless of species) is highest	349	1.71	0.046	50.6	32.7	13.1	2.7	0.9
Be able to hunt when the variety of duck species is greatest (peak variety of ducks at any one point)	346	1.96	0.055	41.1	31.3	20.1	5.2	2.3
Be able to hunt the greatest variety of duck species throughout the length of the season (total variety)	344	2.07	0.060	40.3	26.5	22.3	7.4	3.5
Having maximum opportunity to go duck hunting								
Include the most weekend days in the season	351	2.06	0.060	48.1	21.9	14.3	6.8	8.9
Include the most holidays in the season	338	2.41	0.074	35.6	20.0	24.0	8.8	11.6
Minimizing overlap of waterfowl and deer hunting seasons								
Minimize duck season overlap with the first week of firearm deer season	350	3.02	0.081	23.3	16.9	21.2	11.4	27.1
Avoid opening duck season on same day as youth big game hunting season	345	3.61	0.081	15.8	9.2	17.2	13.6	44.2

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Table 14. Hunter importance ratings assigned to 12 possible reasons for duck hunting season date preferences, among hunters who said that season dates in the **Long Island Zone** were most important to them.

				Importance to date preferences in Long Island Zone				
	n	$\bar{x}$[1]	SE	Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting wood duck, teal species								
Be able to hunt when wood duck and teal are most abundant	252	2.76	0.085	23.0	21.4	27.0	14.2	14.4
Seeing and shooting mallard and black duck								
Be able to hunt when mallard and black duck are most abundant	251	1.53	0.048	60.0	29.2	9.0	1.4	0.5
Be able to hunt when Mallard and Black duck are most susceptible to decoying (newly arriving)	245	1.75	0.059	50.1	31.3	13.7	3.5	1.3
Seeing and shooting diving ducks (e.g., scaup, redhead, bufflehead, goldeneye)								
Be able to hunt when diving ducks are most abundant	251	2.51	0.087	32.3	22.5	18.3	15.7	11.2
Be able to hunt when diving ducks are most susceptible to decoying (newly arriving)	239	2.63	0.088	26.8	24.7	20.3	15.4	12.8

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Table 14. (Continued).

	n	$\bar{x}$[1]	SE	Importance to date preferences in Long Island Zone: Extremely	Very	Moderately	Slightly	Not at all
				%	%	%	%	%
Seeing and shooting ANY ducks (regardless of species)								
Be able to hunt when the abundance of ducks (regardless of species) is highest	251	1.60	0.056	59.3	28.0	8.3	2.4	2.1
Be able to hunt when the variety of duck species is greatest (peak variety of ducks at any one point)	251	1.74	0.057	49.8	31.0	15.8	1.9	1.5
Be able to hunt the greatest variety of duck species throughout the length of the season (total variety)	250	1.88	0.061	44.6	29.8	19.8	4.2	1.5
Having maximum opportunity to go duck hunting								
Include the most weekend days in the season	255	1.96	0.079	52.8	19.6	14.8	4.7	8.1
Include the most holidays in the season	248	2.20	0.086	43.3	20.8	20.0	4.4	11.6
Minimizing overlap of waterfowl and deer hunting seasons								
Minimize duck season overlap with the first week of firearm deer season	253	3.70	0.094	13.7	10.1	17.7	10.1	48.5
Avoid opening duck season on same day as youth big game hunting season	250	4.07	0.082	6.9	9.0	13.1	12.3	58.8

[1] Response options 1-5; 1=extremely important; 2=very important; 3=moderately important; 4=slightly important; 5=not at all important

Importance rankings for factors that may affect satisfaction with season dates

We aggregated 12 individual reasons for season date preferences into 6 categories of factors that influence season date preferences. In every waterfowl hunting zone "seeing and shooting mallard and black duck" was ranked as the most important influence on satisfaction with waterfowl hunting season dates in the zone of most importance to the respondent. "Seeing and shooting diving ducks" and "Minimizing overlap of waterfowl and deer seasons" were ranked as having the least influence on satisfaction with waterfowl hunting season dates in the zone of most importance to the respondent (Figure 1). In each zone, mean importance ranking was the same for some factors. For example, among hunters who reported that season dates were most important to them in the Western Zone there was no statistical difference between mean importance ranking for "seeing and shooting wood duck and teal species" and "having maximum opportunity to go hunting". Among hunters who reported that season dates were most important to them in the Long Island Zone there was no statistical difference between mean importance ranking for "seeing and shooting wood duck and teal species" and "seeing and shooting diving ducks" (Figure 1).

As noted earlier, we found that respondents were more likely than nonrespondents to be avid waterfowl hunters (i.e., were more likely to say waterfowl hunting was more important than, or was their most important, recreational activity). To explore the implications of those differences, we created a weighting factor to adjust the avidity level to account for respondent-nonrespondent differences. We found that the rank order of influences on satisfaction with waterfowl hunting season dates was the same whether the data were weighted or not weighted for hunter avidity.

Hunter Views on Other Issues Related to Season Dates

Importance of incorporating specific holidays

Inclusion or exclusion of specific holidays is a perennial topic of discussion in waterfowl hunter task force meetings. We included items to assess hunter preferences for including 6 holidays that fall within the parameters of opening and closing season dates allowed by USFWS. In most cases, hunters expressed a plurality of responses on the importance of including specific holidays in the waterfowl hunting season where season dates were most important to them (Table 8). There were, however, a few instances where majorities felt strongly about including a particular holiday. Over half of all hunters who said season dates were most important to them in the Western Zone said it was very or extremely important to include New Year's Day in the waterfowl hunting season. Over half of all hunters who cared most about season dates in the Southeastern Zone said it was very or extremely important to include Columbus Day in the season. Over half of all hunters who said season dates were most important in the Long Island Zone said it was very or extremely important to include Thanksgiving, Christmas Eve, New Year's Eve, and New Year's Day in the season (Table 15).

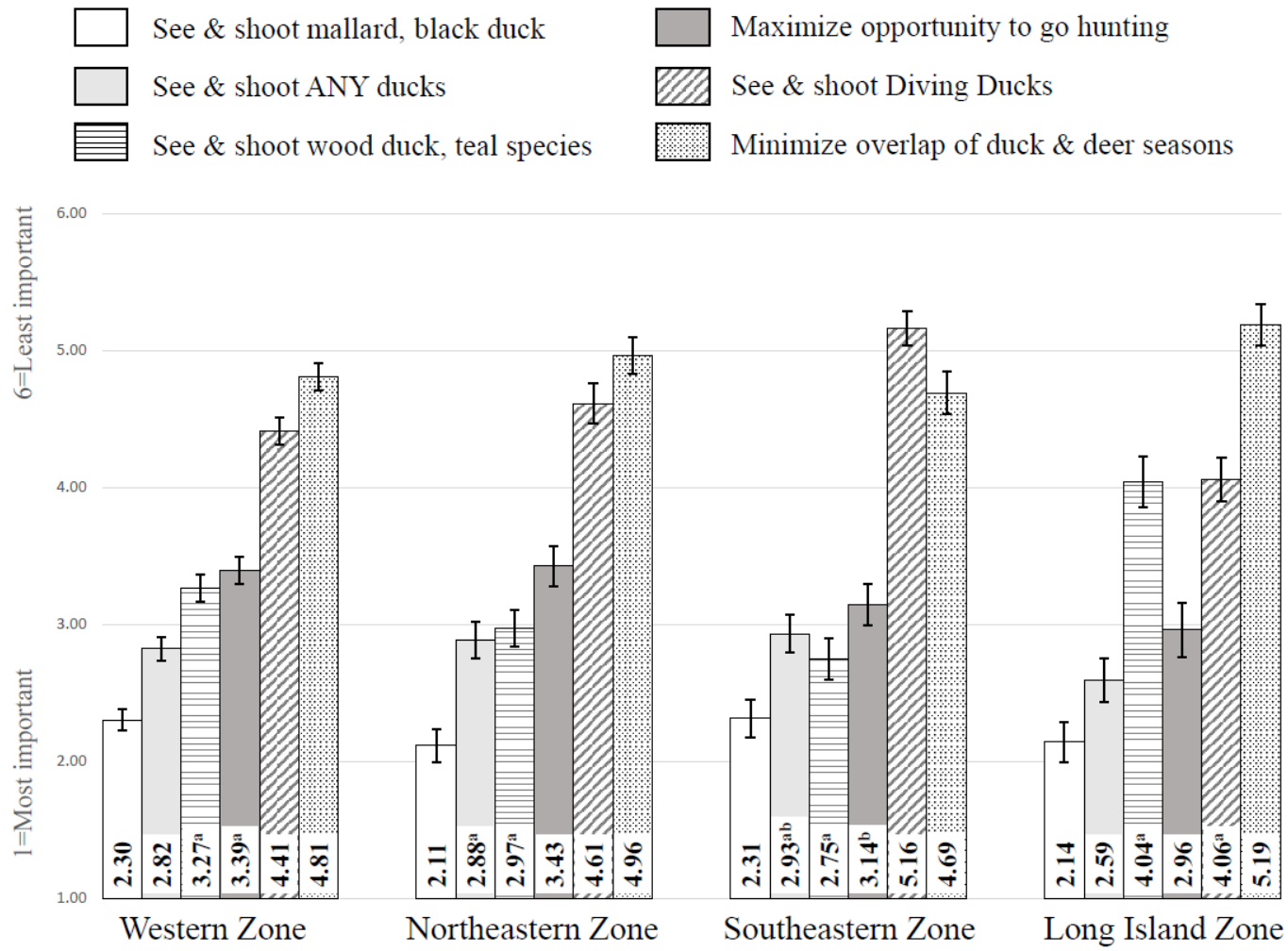

Figure 1. Mean importance ranking of 6 factors that may influence satisfaction with duck hunting season dates; hunters grouped by hunting zones where they found season dates most important. Brackets at the end of each bar represent 95% confidence intervals around the mean. Means in the same zone with the same letter (aa or bb) are not significantly different at p=0.05 level.

Table 15. Importance hunters placed on including specific holidays in the waterfowl hunting season, grouped by zones where respondents found season dates most important.

				Importance		
	n	$\bar{x}$[1]	SE	Very, extremely	Slightly, moderately	Not at all
Columbus Day				(%)	(%)	(%)
Western Zone	1,124	2.03	0.025	32.2	32.2	35.6
Northeastern Zone	526	1.76	0.036	48.9	25.9	25.3
Southeastern Zone	472	1.72	0.038	50.8	25.8	23.3
Long Island Zone	328	2.21	0.046	25.9	26.2	47.9
Thanksgiving						
Western Zone	1,126	1.93	0.025	37.1	32.0	30.9
Northeastern Zone	528	1.72	0.035	49.2	29.4	21.4
Southeastern Zone	470	1.81	0.037	42.1	34.0	23.8
Long Island Zone	341	1.64	0.044	57.5	20.8	21.7
Christmas Eve						
Western Zone	1,129	2.11	0.025	30.6	27.9	41.5
Northeastern Zone	516	2.16	0.037	27.7	27.9	44.4
Southeastern Zone	468	2.04	0.039	33.3	29.3	37.4
Long Island Zone	342	1.70	0.045	53.2	23.1	23.7
Christmas Day						
Western Zone	1,132	2.17	0.025	28.0	26.9	45.1
Northeastern Zone	519	2.24	0.036	24.7	26.6	48.7
Southeastern Zone	468	2.16	0.038	27.6	28.2	44.2
Long Island Zone	341	1.88	0.047	43.1	24.9	32.0
New Year's Eve						
Western Zone	1,130	1.76	0.025	49.4	24.5	26.1
Northeastern Zone	520	2.13	0.037	29.4	27.9	42.7
Southeastern Zone	469	1.97	0.039	37.1	28.1	34.8
Long Island Zone	343	1.63	0.043	57.1	22.2	20.7
New Year's Day						
Western Zone	1,137	1.71	0.025	53.2	22.9	23.9
Northeastern Zone	520	2.11	0.037	31.2	26.3	42.5
Southeastern Zone	468	1.96	0.039	37.6	28.6	33.8
Long Island Zone	344	1.64	0.044	57.0	21.5	21.5

[1] Response options 1-3; 1=extremely or very important; 2=moderately or slightly important; 3=not at all important

Opening the season in different dates in each hunting zone

A subset of New York's waterfowl hunters are active in 2 or more waterfowl hunting zones each year. Some of these multi-zone hunters have contacted a waterfowl hunter task force member to express their interest in creating different season opening dates in each zone, so that hunters have an opportunity to hunt on an opening day in more than one location. To gauge hunter opinion on this topic, we asked hunters how important is was to them that the first split of the duck season opens on a different day in each hunting zone. Relatively few hunters described this as very or extremely important to them, and more than half of respondents who favored the Western Zone or Long Island Zone said that was not at all important to them. (Table 16).

We found a significant difference ($\chi 2=65.98$, df=2, $p<0.001$) between avid hunters (those who said waterfowl hunting was their most important, or among their most important recreational activities) and non-avid hunters on this topic. Twenty-two percent of avid hunters reported that it was very or extremely important to them to open zones on a different day (35% reported it was slightly or moderately important; 43% found it not at all important. By contrast, 10% of non-avid hunters reported that it was very or extremely important to them to open zones on a different day (33% reported it was slightly or moderately important; 57% found it not at all important).

Overlap in duck and goose hunting seasons

In recent years, waterfowl hunter task forces have expressed interest in substantial overlap between season dates for duck and goose hunting. Regardless of hunting zone where season dates were most important to the respondents, we found that the majority of hunters preferred that duck and goose seasons overlap as much as possible (Table 17).

Table 16. Importance that first split of duck season opens on a different day in each waterfowl hunting zone, grouped by waterfowl hunting zones where respondents found season dates most important.

				Importance		
	n	$\bar{x}^1$	SE	Very, extremely	Slightly, moderately	Not at all
				%	%	%
Western Zone	1,183	2.34	0.022	16.7	32.4	51.0
Northeastern Zone	556	2.24	0.032	19.8	36.0	44.2
Southeastern Zone	500	2.20	0.035	22.0	35.2	42.8
Long Island Zone	356	2.39	0.038	13.8	32.6	53.7

Table 17. Preference for amount of overlap between duck and goose seasons, grouped by waterfowl hunting zones where respondents found season dates most important.

				Amount of season overlap preferred		
	n	$\bar{x}$[1]	SE	As much as possible	As little as possible	No opinion
				%	%	%
Western Zone	852	1.35	0.025	80.6	3.9	15.5
Northeastern Zone	380	1.31	0.042	83.9	3.7	11.8
Southeastern Zone	367	1.27	0.033	83.9	5.4	10.6
Long Island Zone	254	1.44	0.050	75.2	5.1	19.7

SUMMARY AND CONCLUSIONS

The primary purpose of this study was to obtain representative data on what New York State duck hunters find valuable with respect to waterfowl hunting season dates in their favorite waterfowl hunting zone (i.e., the Western Zone, Northeastern Zone, Southeastern Zone, or Long Island Zone). Although hunters reported that multiple factors influence their preferences for and satisfaction with waterfowl hunting season dates, seeing and shooting mallard and black duck was consistently ranked as the factor that had the most influence on their satisfaction with waterfowl hunting season dates. Seeing and shooting diving ducks, and minimizing overlap of waterfowl and deer seasons, were consistently ranked as factors that had the least influence on their satisfaction with waterfowl hunting season dates.

Study Limitations

A significant portion of mail-survey respondents did not correctly complete the question where they were asked to rank 6 factors with respect to how those factors influenced satisfaction with waterfowl hunting season dates in their preferred hunting zone. We excluded those respondents from our analysis of survey questions where respondents were asked to rate or rank factors that affected their satisfaction with waterfowl hunting season dates. We anticipated that some responses would not be useable, and started with a large sample size (n=6,000) to ensure that the useable number of responses would be acceptable for key comparisons.

Next Steps

Data on waterfowl hunter satisfactions were provided to NYCFWRU researchers and are being used by DEC (in combination with other information) to evaluate alternative sets of hunting season dates in each waterfowl hunting zone. Personnel from the New York Cooperative Fish and Wildlife Research Unit (NYCFWRU) will advise and assist DEC in using data on hunter

satisfactions in a structured decision making approach to evaluating season date alternatives developed by the waterfowl hunter task forces.

LITERATURE CITED

Enck, J. W., and D. J. Decker. 1990. Influences on waterfowl hunting participation in New York. Human Dimensions Research Unit Publication 90-2. New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, NY. USA.

Enck, J. W., T. L. Brown, W. Sharick, and B. L. Swift. 2006. Duck hunter preferences for season dates and opinions about a task force approach for setting season dates in New York. Human Dimensions Research Unit series publication 06-11. Department of Natural Resources, Cornell University, Ithaca, NY. 54 pp.

IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.

Laborde Jr., L. P., F. C. Rohwer, M. D. Kaller, and L. A. Reynolds. 2014. Surveying Louisiana Waterfowl Hunters: Open Web and Random Mail Surveys Produce Similar Responses to Attitudinal Questions. Wildlife Society Bulletin 38(4):821–826.

Lesser, V. M., D. K. Yang, and L. D. Newton. 2011. Assessing Hunters' Opinions Based on a Mail and a Mixed-Mode Survey. Human Dimensions of Wildlife 16(3):164–173.

APPENDIX A

Study Questionnaire

2017 New York State Duck Hunter Survey

Each year, DEC must set waterfowl hunting season dates in 4 New York waterfowl hunting zones (i.e., Western, Northeastern, Southeastern, Long Island). The U.S. Fish and Wildlife Service (USFWS) sets limits on the maximum number of days, the earliest possible opening date, and latest possible closing date for waterfowl seasons. It is up to DEC to select the season dates within the guidelines of the USFWS.

This survey is part of an effort by DEC to ensure that the perspectives of a cross section of waterfowl hunters are considered when those season dates are selected. The survey will provide DEC with information from a representative sample of duck hunters.

DEC will work in conjunction with the waterfowl task force (made up of duck hunter representatives) in each hunting zone to develop a suite of season date configurations (alternatives) that will be evaluated based on the results of this survey. The survey data will be used to clarify how different season date alternatives would affect overall hunting satisfaction in each hunting zone and to identify which alternative maximizes hunting satisfaction.

Please make your voice heard today by taking a few minutes to complete this questionnaire. Your identity will be kept confidential and the information you give us will never be associated with your name.

To return this questionnaire, simply seal it with the white reusable seal (postage has already been provided) and drop it in the nearest mailbox.

THANK YOU FOR YOUR HELP!

PART I: GENERAL DUCK HUNTING EXPERIENCES

1. When did you start hunting <u>ducks</u>? *(Please check [√] one box.)*

- ☐ Before 1980
- ☐ 1980 to 1989
- ☐ 1990 to 1999
- ☐ 2000 to 2009
- ☐ 2010 or later

2. How many of the last 5 years have you hunted ducks? (*Check [√] one box.)*

0	1	2	3	4	5
☐	☐	☐	☐	☐	☐

3. During the 2016-2017 season, how many days did you hunt <u>ducks</u> in each of the following waterfowl hunting zones in New York State? (if none, write in 0.*)*

(Note: The Lake Champlain Zone season dates are set by the Vermont Fish and Wildlife Management Board, not DEC.)

Western Zone	_____ days
Northeastern Zone	_____ days
Lake Champlain Zone	_____ days
Southeastern Zone	_____ days
Long Island Zone	_____ days

4. How important is duck hunting to you? *(Check [√] one box.)*

- ☐ It's my **most important** recreational activity
- ☐ It's **more** important than many of my recreational activities
- ☐ It's no more important than my other recreational activities
- ☐ It's **less** important than many of my recreational activities
- ☐ It's one of my **least important** recreational activities

PART II: SPECIFIC DUCK HUNTING EXPERIENCES

The following questions pertain to your hunting experiences in New York during the 2016-2017 season. If you hunted different types of waterfowl, different habitats, or used different techniques on any one day, consider the type of activity you did most of the time. For example, you may have set up duck decoys in a marsh, but you would have taken a goose if you had the opportunity; count that as 1 day duck hunting and 0 days goose hunting.

5. **How many days did you hunt primarily for diving ducks, puddle ducks, sea ducks, or geese in New York during the 2016-2017 season?** (If none, write in 0.*)*

Diving ducks (scaup, redhead, bufflehead, common goldeneye, etc.)	_____ days
Puddle ducks (mallards, wood ducks, blue-winged teal, green-winged teal, etc.)	_____ days
Sea ducks (scoters, eiders, long-tailed duck)	_____ days
Geese (Canada geese, snow geese, brant)	_____ days

6. **How many days did you duck hunt in each of the following habitat types in New York during the 2016-2017 season?** (If none, write in 0.*)*

Habitat that becomes inaccessible to ducks after freezing temperatures (e.g. shallow marsh, beaver pond, small river)	_____ days
Habitat that remains accessible to ducks after freezing temperatures (e.g., big lakes, big rivers, or ocean)	_____ days
Agricultural fields	_____ days

7. **How many days did you hunt on each of the following types of property in New York during the 2016-2017 season?** (If none, write in 0.*)*

Public land (federal, state, county, etc.) or publicly-accessible waterways	_____ days
Private land or waters (for free)	_____ days
Private land or waters (for pay) including leased land, shooting preserve, or waterfowl hunting club	_____ days

8. **In which <u>one</u> waterfowl hunting zone are season dates most important to you?** *(Check [√] one box.)*

(Note: The Lake Champlain Zone is not included here because seasons there are set by the Vermont Fish and Wildlife Management Board.)

- ☐ Western Waterfowl Hunting Zone
- ☐ Northeastern Waterfowl Hunting Zone
- ☐ Southeastern Waterfowl Hunting Zone
- ☐ Long Island Waterfowl Hunting Zone

PART III: SOURCES OF DUCK HUNTING SATISFACTION

These questions will help DEC understand how duck hunting season dates may affect hunter satisfaction in different waterfowl hunting zones.

Note: Answer all questions in this section with respect to the factors that affect your preferences for season dates in the zone where season dates are most important to you (i.e., your answer to question 8 above). These questions are not related to your preferences with respect to the current waterfowl season dates, but rather your general preferences that will be used to inform future waterfowl season dates.

9. How important are each of the following possible reasons for your preference for when the duck season should be open in the zone that is most important to you? (*Check [V] one box per row.)*

	Extremely important	Very important	Moderately important	Slightly important	**Not at all** important
Seeing and shooting wood duck, blue-winged teal, and green-winged teal ***How important is it to…***					
Be able to hunt when wood duck, blue-winged teal, and green-winged teal are most abundant	☐	☐	☐	☐	☐
Seeing and shooting mallard and black duck ***How important is it to…***					
Be able to hunt when mallard and black duck are most abundant	☐	☐	☐	☐	☐
Be able to hunt when mallard and black duck are most susceptible to decoying (newly arriving)	☐	☐	☐	☐	☐
Seeing and shooting diving ducks (e.g.,scaup, redhead, bufflehead, and common goldeneye) ***How important is it to…***					
Be able to hunt when diving ducks are most abundant	☐	☐	☐	☐	☐
Be able to hunt when diving ducks are most susceptible to decoying (newly arriving)	☐	☐	☐	☐	☐

9. (continued). (*Check [V] one box per row.)*

	Extremely important	Very important	Moderately important	Slightly important	**Not at all** important
Seeing and shooting ANY ducks (regardless of species) ***How important is it to…***					
Be able to hunt when the abundance of ducks (regardless of species) is highest	☐	☐	☐	☐	☐
Be able to hunt when the variety of duck species is greatest (peak variety of ducks at any one point during the season)	☐	☐	☐	☐	☐
Be able to hunt the greatest variety of duck species throughout the length of the season (total variety)	☐	☐	☐	☐	☐
Having maximum opportunity to go duck hunting ***How important is it to…***					
Include the most weekend days in the season	☐	☐	☐	☐	☐
Include the most holidays in the season	☐	☐	☐	☐	☐
Minimizing overlap of waterfowl and deer hunting seasons ***How important is it to…***					
Minimize duck season overlap with the first week of firearm deer season	☐	☐	☐	☐	☐
Avoid opening duck season on same day as youth big game hunting season	☐	☐	☐	☐	☐

10. The items you rated in the last question have been grouped into broad categories below. **RANK the categories in order from 1 to 6, according to how much they influence your satisfaction with waterfowl hunting season dates in the zone that is most important to you.**

***1 = MOST important** category*	*4 = 4th most important*
2 = 2nd most important	*5 = 5th most important*
3 = 3rd most important	***6 = LEAST important** category*

USE EACH NUMBER (1-6) ONLY ONCE IN THE TABLE BELOW

	Rank in order from 1 to 6
Seeing and shooting wood duck and teal species (being able to hunt when wood duck and teal species are most abundant)	Rank: ___
Seeing and shooting mallard and black duck (being able to hunt when mallard and black duck are most abundant or most susceptable to decoying)	Rank: ___
Seeing and shooting diving ducks (e.g., scaup, redhead, common goldeneye) (being able to hunt when diving ducks are most abundant or most susceptable to decoying)	Rank: ___
Seeing and shooting ANY ducks (regardless of species) (being able to hunt when abundance of ducks (any species) is highest, or when the variety of duck species is greatest)	Rank: ___
Having maximum opportunity to go duck hunting (including most weekend days and holidays in the season)	Rank: ___
Minimizing overlap of waterfowl and deer hunting seasons (minimize duck season overlap with the first week of firearm deer season, avoid opening duck season on same day as youth big game hunting season)	Rank: ___

PART IV: YOUR VIEWS ON OTHER SEASON ISSUES

11. How important is it to you that the waterfowl season in your favorite hunting zone include the following holidays? *(Check [√] one box per line.)*

	Extremely important	Very important	Moderately important	Slightly important	**Not at all** important
Columbus Day	☐	☐	☐	☐	☐
Thanksgiving	☐	☐	☐	☐	☐
Christmas Eve	☐	☐	☐	☐	☐
Christmas Day	☐	☐	☐	☐	☐
New Year's Eve	☐	☐	☐	☐	☐
New Year's Day	☐	☐	☐	☐	☐

12. Which of the following statements best reflects your preference for the amount of overlap between duck and goose seasons in your favorite waterfowl hunting zone? *(Check [√] one box.)*

☐ I prefer that duck and goose season dates overlap <u>as much</u> as possible

☐ I prefer that duck and goose season dates overlap <u>as little</u> as possible

☐ I have no opinion on the amount of overlap between duck and goose season dates

13. How important is it to you that the first split of duck season opens on a different day in each waterfowl hunting zone? *(Check [√] one box.)*

☐ Extremely important
☐ Very important
☐ Moderately important
☐ Slightly important
☐ Not at all important

PART V: YOUR OTHER HUNTING ACTIVITIES

14. What other types of hunting have you participated in sometime during the last 5 years? *(Check [√] all that apply.)*

- ☐ Goose hunting
- ☐ Deer hunting during regular firearms season
- ☐ Deer hunting outside of regular firearms season (e.g., archery or muzzleloader seasons)
- ☐ Pheasant hunting

15. Do you belong to any national organizations related to waterfowl hunting or waterfowl management (e.g., Ducks Unlimited)? *(Check [√] one box.)*

- ☐ Yes
- ☐ No

16. Do you belong to any New York State or local organizations related to waterfowl hunting or waterfowl management (e.g., local sportsmen's association)? *(Check [√] one box.)*

- ☐ Yes
- ☐ No

THANK YOU FOR YOUR PARTICIPATION!

Please use the space below to offer any comments you would like to make concerning season dates for duck hunting in New York.

APPENDIX B

Nonrespondent – Respondent Comparisons

Table B1. Comparison of nonrespondents and respondents on time period in which they began hunting ducks.

	Nonrespondents		Respondents			
	n	%	n	%	χ^2	P value
Before 1980	22	11.0	880	30.7	57.455	<0.001
1980 to 1989	21	10.6	369	12.9		
1990 to 1999	20	10.1	375	13.1		
2000 to 2009	53	26.6	584	20.4		
2010 or later	83	41.7	655	22.9		
Total	199	100.0	2865	100.0		

Table B2. Comparison of nonrespondents and respondents on personal importance they place on hunting ducks.

	Nonrespondents		Respondents			
	n	%	n	%	χ^2	P value
It is my *most important* recreational activity	35	17.6	543	19.0	20.684	<0.001
It is *more* important than many of my recreational activities	82	41.2	1399	49.1		
It is no more important than my other recreational activities	56	28.1	742	26.0		
It is less important than many of my recreational activities	23	11.6	132	4.6		
It is one of my *least important* recreational activities	3	1.5	32	1.1		
Total	199	100.0	2851	100.0		

Table B3. Comparison of nonrespondents and respondents on number years they have participated in duck hunting in the last 5 years.

	Nonrespondents		Respondents			
	n	%	n	%	χ^2	P value
0 years	1	.5	22	0.8	29.912	<0.001
1 year	9	4.5	44	1.5		
2 years	22	11.1	145	5.1		
3 years	26	13.1	280	9.8		
4 years	26	13.1	252	8.8		
5 years	115	57.8	2110	73.9		
Total	199	100.0	2854	100.0		

Table B4. Comparison of nonrespondents and respondents on whether they participated in goose hunting in the last 5 years.

	Nonrespondents		Respondents			
	n	%	n	%	χ^2	P value
Yes	171	85.5	2440	88.0	1.053	0.304
No	29	14.5	334	12.0		
Total	200	100.0	2774	100.0		

Table B5. Comparison of nonrespondents and respondents on whether they participated in deer hunting in the last 5 years.

	Nonrespondents		Respondents			
	n	%	n	%	χ^2	P value
Yes	178	89.0	2361	85.1	2.258	0.132
No	22	11.0	413	14.9		
Total	200	100.0	2774	100.0		

Table B6. Comparison of nonrespondents and respondents on most important hunting zone.

Zone where season dates are most important to respondent	Nonrespondents		Respondents			
	n	%	n	%	χ^2	P value
Western	88	44.0	1207	44.7	2.37	0.499
Northeastern	51	25.5	580	21.5		
Southeastern	39	19.5	508	18.8		
Long Island	22	11.0	369	13.7		
Total	200	100.0	2699	100.0		

Table B7. Comparison of nonrespondents and respondents on gender.

	Nonrespondents		Respondents			
	n	%	n	%	χ^2	P value
Male	195	97.5	2818	98.1	0.292	0.588
Female	5	2.5	56	1.9		
Total	200	100.0	2874	100.0		

Table B8. Comparison of nonrespondents and respondents on mean days of hunting for waterfowl species groups.

	n	$\bar{X}$	SD	*t*	df	P value
Diving ducks						
Nonrespondents	174	2.93	5.061	1.258	2559	0.2083
Respondents	2387	3.56	6.46			
Puddle ducks						
Nonrespondents	173	7.77	8.172	2.711	2811	0.0067
Respondents	2640	9.69	9.076			
Sea ducks						
Nonrespondents	174	0.69	2.864	0.563	2190	0.5736
Respondents	2018	0.84	3.413			